CLAIMS

WHAT IS CLAIMED:

1. A method for initializing tool controllers based on tool event data, comprising:

providing a tool having a tool controller adapted to control an operating recipe of the tool;

receiving a tool event notification; and

initializing the tool controller in response to receiving the tool event notification.

2. The method of claim 1, wherein initializing the tool controller comprises:

estimating a control variable value; and

initializing a control algorithm of the tool controller based on the estimated control variable value.

3. The method of claim 2, wherein the tool comprises an etch tool adapted to etch features on a semiconductor wafer, and estimating the control variable value includes estimating an etch rate.

4. The method of claim 2, wherein the tool comprises a deposition tool adapted to planarize a semiconductor wafer, and estimating the control variable value includes estimating a material removal rate.

5. The method of claim 2, wherein the tool comprises a deposition tool adapted to form a layer on a semiconductor wafer, and estimating the control variable value includes estimating a deposition rate.

6. The method of claim 1, further comprising:

performing a qualification procedure on the tool in response to receiving the tool event notification to determine a control variable value; and

initializing a control algorithm of the tool controller based on the control variable value.

7. The method of claim 6, wherein the tool comprises a polishing tool adapted to planarize a semiconductor wafer, and performing the qualification procedure comprises processing a test wafer in the polishing tool to determine a blanket wafer removal rate.

8. The method of claim 6, wherein the tool comprises a photolithography stepper adapted to expose a photoresist layer on a semiconductor wafer, and performing the qualification procedure comprises processing a test wafer in the photolithography stepper to determine an overlay characteristic of the photolithography stepper.

9. The method of claim 6, wherein the tool comprises a deposition tool adapted to form a layer on a semiconductor wafer, and performing the qualification procedure comprises depositing the process layer on a test wafer in the deposition tool to determine a deposition rate.

10. The method of claim 6, wherein the tool comprises an etch tool adapted to etch features on a semiconductor wafer, and performing the qualification procedure comprises etching a test wafer in the etch tool to determine an etch rate.

11. The method of claim 1, wherein receiving the tool event notification comprises receiving a notification of at least one of a tool calibration and a tool preventative maintenance activity.

12. The method of claim 1, wherein the tool comprises a polishing tool having at least one polishing pad adapted to planarize a semiconductor wafer, and receiving the tool event notification comprises receiving a notification when the polishing pad is replaced.

13. The method of claim 1, wherein the tool comprises a polishing tool having at least one polishing pad adapted to planarize a semiconductor wafer, and receiving the tool event notification comprises receiving a notification when the polishing pad is conditioned.

14. The method of claim 1, wherein the tool comprises an etch tool having a chamber, and receiving the tool event notification comprises receiving a notification when the chamber is cleaned.

15. The method of claim 1, wherein the tool comprises a deposition tool having a chamber, and receiving the tool event notification comprises receiving a notification when the chamber is cleaned.

16. The method of claim 1, wherein the tool comprises a photolithography stepper adapted to expose a photoresist layer on a semiconductor wafer, and receiving the tool event notification comprises receiving a notification when a red-blue calibration is performed on the photolithography stepper.

17. A method for initializing tool controllers based on tool event data, comprising:

providing a tool having a tool controller adapted to control an operating recipe of the tool;

receiving a tool event notification;

performing a qualification procedure on the tool in response to receiving the tool event notification to determine a control variable; and

initializing the tool controller based on the control variable.

18. The method of claim 17, wherein the tool comprises a polishing tool adapted to planarize a semiconductor wafer, and performing the qualification procedure comprises processing a test wafer in the polishing tool to determine a blanket wafer removal rate.

19. The method of claim 17, wherein the tool comprises a photolithography stepper adapted to expose a photoresist layer on a semiconductor wafer, and performing the qualification procedure comprises processing a test wafer in the photolithography stepper to determine an overlay characteristic of the photolithography stepper.

20. The method of claim 17, wherein the tool comprises a deposition tool adapted to form a layer on a semiconductor wafer, and performing the qualification procedure comprises depositing the process layer on a test wafer in the deposition tool to determine a deposition rate.

21. The method of claim 17, wherein the tool comprises an etch tool adapted to etch features on a semiconductor wafer, and performing the qualification procedure comprises etching a test wafer in the etch tool to determine an etch rate.

22. The method of claim 17, wherein receiving the tool event notification comprises receiving a notification of at least one of a tool calibration and a tool preventative maintenance activity.

23. The method of claim 17, wherein the tool comprises a polishing tool having at least one polishing pad adapted to planarize a semiconductor wafer, and receiving the tool event notification comprises receiving a notification when the polishing pad is replaced.

24. The method of claim 17, wherein the tool comprises a polishing tool having at least one polishing pad adapted to planarize a semiconductor wafer, and receiving the tool event notification comprises receiving a notification when the polishing pad is conditioned.

25. The method of claim 17, wherein the tool comprises an etch tool having a chamber, and receiving the tool event notification comprises receiving a notification when the chamber is cleaned.

26. The method of claim 17, wherein the tool comprises a deposition tool having a chamber, and receiving the tool event notification comprises receiving a notification when the chamber is cleaned.

27. The method of claim 17, wherein the tool comprises a photolithography stepper adapted to expose a photoresist layer on a semiconductor wafer, and receiving the tool event notification comprises receiving a notification when a red-blue calibration is performed on the photolithography stepper.

28. A manufacturing system, comprising:

a tool adapted to process wafers in accordance with an operating recipe; and

a tool controller adapted to control the operating recipe in accordance with a control algorithm, wherein the tool controller is further adapted to receive a tool event notification and initialize the control algorithm in response to receiving the tool event notification.

29. The manufacturing system of claim 28, further comprising a process control server adapted to send the tool event notification to the tool controller.

30. The manufacturing system of claim 28, wherein the tool event notification comprises a notification of at least one of a tool calibration and a tool preventative maintenance activity.

31. The manufacturing system of claim 28, wherein the tool controller is adapted to estimate a control variable value and initialize the control algorithm based on the estimated control variable value.

32. The manufacturing system of claim 31, wherein the tool comprises an etch tool adapted to etch features on a semiconductor wafer, and the estimated control variable value comprises an etch rate.

33. The manufacturing system of claim 31, wherein the tool comprises a deposition tool adapted to form a layer on a semiconductor wafer, and the estimated control variable value comprises a deposition rate.

34. The manufacturing system of claim 31, wherein the tool comprises a polishing tool adapted to planarize a semiconductor wafer, and the estimated control variable value comprises a polishing rate.

35. The manufacturing system of claim 29, wherein the tool controller is adapted to contact the process control server to schedule a qualification procedure on the tool in response to receiving the tool event notification.

36. The manufacturing system of claim 35, wherein the tool is adapted to perform the qualification procedure to determine a control variable value.

37. The manufacturing system of claim 36, wherein the tool comprises a polishing tool adapted to planarize a semiconductor wafer, and the qualification procedure comprises processing a test wafer in the polishing tool to determine a blanket wafer removal rate as the control variable value.

38. The manufacturing system of claim 36, wherein the tool comprises a photolithography stepper adapted to expose a photoresist layer on a semiconductor wafer, and the qualification procedure comprises processing a test wafer in the photolithography stepper to determine an overlay characteristic of the photolithography stepper.

39. The manufacturing system of claim 36, wherein the tool comprises an etch tool adapted to etch features on a semiconductor wafer, and the qualification procedure comprises etching a test wafer in the polishing tool to determine an etch rate as the control variable value.

40. The manufacturing system of claim 36, wherein the tool comprises a deposition tool adapted to form a process layer on a semiconductor wafer, and the qualification procedure comprises forming the process layer on a test wafer in the polishing tool to determine a deposition rate as the control variable value.

41. The manufacturing system of claim 28, wherein the tool comprises a polishing tool having at least one polishing pad adapted to planarize a semiconductor wafer, and the tool event notification comprises a notification that the polishing pad has been replaced.

42. The manufacturing system of claim 28, wherein the tool comprises a polishing tool having at least one polishing pad adapted to planarize a semiconductor wafer, and the tool event notification comprises a notification that the polishing pad has been conditioned.

43. The manufacturing system of claim 28, wherein the tool comprises an etch tool having a chamber, and the tool event notification comprises a notification that the chamber has been cleaned.

44. The manufacturing system of claim 28, wherein the tool comprises a deposition tool having a chamber, and the tool event notification comprises a notification that the chamber has been cleaned.

45. The method of claim 28, wherein the tool comprises a photolithography stepper adapted to expose a photoresist layer on a semiconductor wafer, and the tool event notification comprises a notification that a red-blue calibration has been performed on the photolithography stepper.